scanning electron microphotograph (SEM) (refer to, for example, Fig. 3(b)) of the cross section of the structure 1. Mean thickness D_2 of the shell layer 8 may also be calculated by image analysis using SEM microphotograph (refer to, for example, Fig. 3(b)).

A ratio d_{S1}/d_{S2} of the mean particle size d_{S1} of the diamond particles 5 included in the shell layer 8 to the mean particle size d_{S2} of the hard particles 6 included in the shell layer 8 is preferably in a range from 0.4 to 3.0 in order to control the concentration distribution due to infiltration of the binding metal and achieve uniform distribution of the iron group metal.

Mean diameter D_1 of the core material 4 is preferably 500 μ m or smaller, more preferably in a range from 2 to 200 μ m, and mean thickness D_2 of the shell layer 8 is preferably 500 μ m or smaller, more preferably in a range from 2 to 200 μ m, when the application for structural member is taken into consideration. In order to achieve higher hardness, ratio D_2/D_1 of the mean thickness D_2 of the shell layer 8 to the mean diameter D_1 of the core material 4 is preferably in a range from 0.01 to 0.5.

Fig. 3(a), (b) show another example of the composite structure used in the present invention. The composite structure 10 shown in Fig. 3(a) is a multiple filament type composite structure made by bundling a plurality of single filament type composite structure 1 each of which is constituted from the core material 4 and a shell layer 8 that is made of a material having different composition from that of the core material 4 and covers the circumference of the core material 4.

The composite structure of the present invention may have such configurations as, in addition to the multiple filament type composite structure, sheet-like structure 15a made by disposing the composite structures 1 in a sheet-like configuration as shown in Fig. 4(a), laminated structure 15b made by stacking a plurality of the sheet-like structures 15a in the same direction as shown in Fig. 4(b), or laminated structure 15c made by stacking a plurality of the sheet-like structures 15a in different directions as shown in Fig. 4(c).